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Supporting Information

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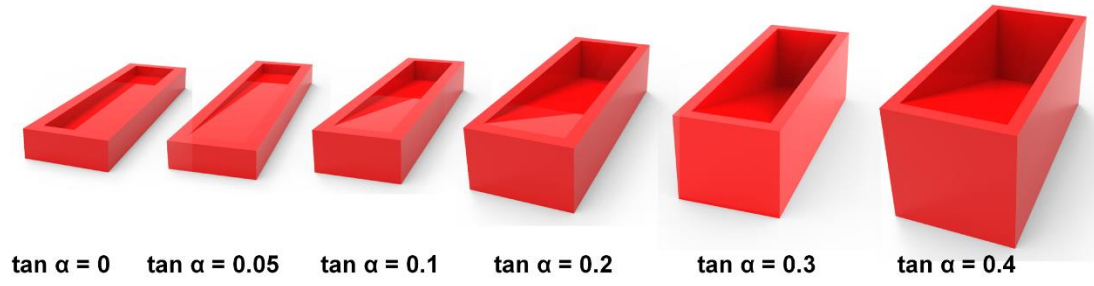* Corresponding author: elelc@nus.edu.sg (C.L.)

Fig. S1 | Moulds to fabricate the APTN with different gradient (tan α=0, 0.05, 0.1, 0.2, 0.3, 0.4)
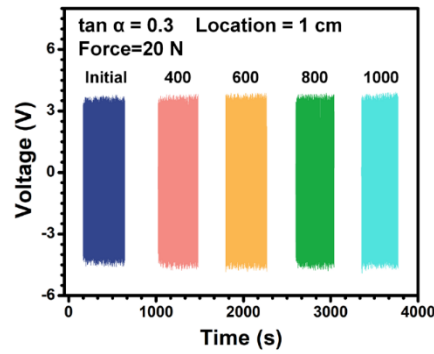

Fig. S2 | The stability test for the APTN with continuous touching on surface of the APTN by a force gauge stage for 1000 cycles.
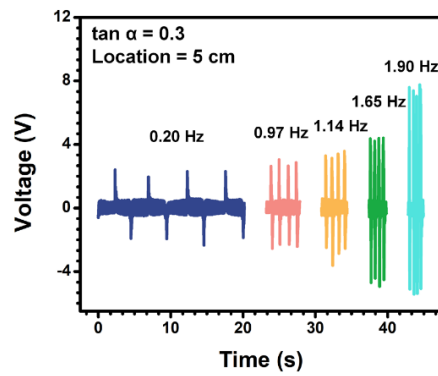

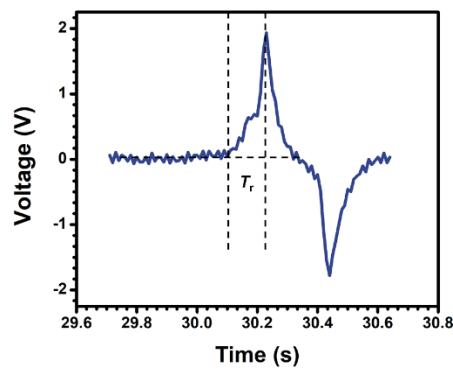**Fig. S3** | Voltage responses of APTN at different frequencies.

Fig. S4 | The enlarged view of the response of APTN with 2 cm grids, which renders a response time of 130 ms.
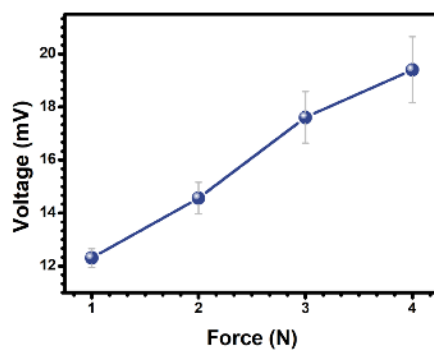

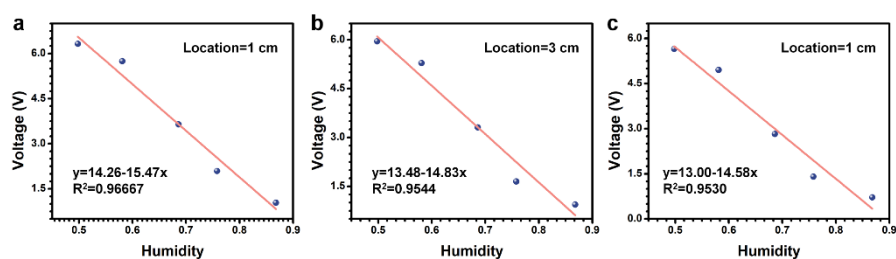**Fig. S5 |** Relationship of output peak voltage of the force sensor and the applied force between 1 N to 4 N.

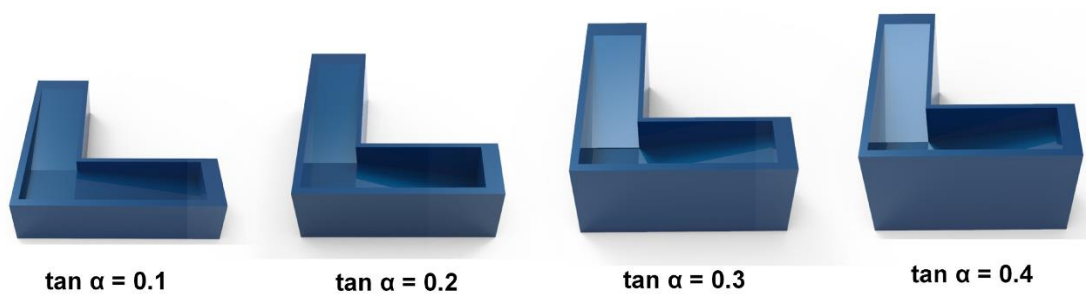**Fig. S6 |** The output voltage of the APTN with a location of a) 1 cm, b) 3 cm and c) 5 cm as a function of humidity

tan α = 0.1   tan α = 0.2   tan α = 0.3   tan α = 0.4

Fig. S7 | Moulds to fabricate the L-shaped APTN with different gradient (tan α= 0.1, 0.2, 0.3, 0.4).

Bottom Support   Outside Mold   Middle Support

Fig. S8 | Moulds to fabricate the APTN based prosthetic arm with a gradient of tan α=0.3.
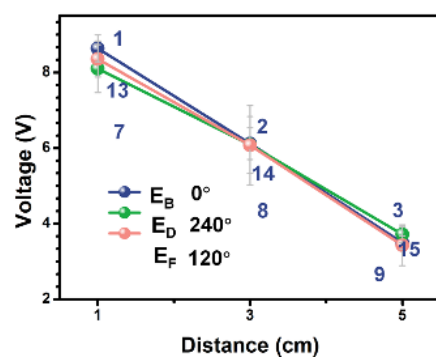

Fig. S9 | Digital voltage of three electrodes when a finger sliding on the relevant grid.